**Computer Organization and Architecture**

**Lab Report**

**Lab 01**



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|  |  |
| Class | Computer Organization and Architecture CPE343(**BCE-5B**) |
| Instructor’s Name | Dr. Adeel Israr |

In-Lab Tasks

Task 1:

Write a program which inputs the bill amount and the amount paid by the customer. It calculates the amount to be returned to the customer and displays it.

Solution:

I am attaching my commented code below,

#Title: Lab 1 Task 1. Filename: Lab1Task1.asm

#Author: Muhammad Haris Irfan. Date: 15-09-20

#Roll Number: FA18-BCE-090 Description: Subtraction

#Registers: $t1, $t2, $t3, $v0, $a0

########### Data Segment ############################################################

.data

one: .word

two: .word

value: .word

string1 : .asciiz "Enter the total bill amount?"

string2: .asciiz "Enter the amount payed by the customer?"

string3: .asciiz "The amount to be returned is: "

################## Code Segment ######################################################

.text

main:

la $a0,string1 #Load string1

li $v0,4 #output string1

syscall

li $v0,5 #input integer

syscall

move $t1,$v0 #copy $vo to $t1

la $a0,string2 #Load string1

li $v0,4 #output string1

syscall

li $v0,5 #input integer

syscall

move $t2,$v0 #copy $vo to $t1

Sub $t3,$t1,$t2 #subtracting t1 from t2 and saving result in t3

la $a0,string3 #load string3

li $v0,4 #output string3

syscall

li $v0,1 #output integer

move $a0,$t3 #copy t3 to a0

syscall

li $v0,10 #exit

syscall

A screenshot of a computer

Description automatically generatedThe result for this program is shown below,

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Task 2:

A store is offering 20% discount on all purchases. Write a program which inputs total purchase bill in rupees, total amount paid by the customer and calculates the amount to be returned to the customer.

Solution:

I am attaching my commented code below,

#Title : Lab 1 Task 2. Filename: Lab1Task2.asm

#Author: Muhammad Haris Irfan. Date: 15-09-20

#Roll Number: FA18-BCE-090 Description: Subtraction

#Registers: $t1, $t2, $t3,$t4,$t5, $v0, $a0

############ Data Segment ############################################################

.data

one: .word

two: .word

value: .word

string1 : .asciiz "Enter the total bill amount?"

string2: .asciiz "Enter the amount payed by the customer?"

string3: .asciiz "The amount to be returned is: "

############# Code Segment ######################################################

.text

main:

la $a0,string1 #Load string1

li $v0,4 #output string1

syscall

li $v0,5 #input integer

syscall

move $t1,$v0 #copy $v0 to $t1

la $a0,string2 #Load string1

li $v0,4 #output string1

syscall

li $v0,5 #input integer

syscall

move $t2,$v0 #copy $v0 to $t1

mul $t3, $t2, 80 #multiply t2 with 80 and update t3

div $t4, $t3, 100 #divide t3 with 100 and update t4

sub $t5, $t1, $t4 #subtract t1 from t4 and update t5

la $a0,string3 #Load string1

li $v0,4 #output string1

syscall

li $v0,1 #output integer

move $a0,$t5 #copy $v0 to $t1

syscall

li $v0,10 #exit

syscall

The result for this program is shown below,

A screenshot of a social media post

Description automatically generated

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Task 3:

Write a program that inputs Marks of QA (out of 25), Sessional1 (out of 10), Sessional2 (out of 15), Terminal (out of 50); then calculates and displays total marks.

Solution:

I am attaching my commented code below,

#Title : Lab 1 Task 3. Filename: Lab1Task3.asm

#Author: Muhammad Haris Irfan. Date: 15-09-20

#Roll Number: FA18-BCE-090 Description: Subtraction

#Registers: $t1, $t2, $t3, $t4, $t5, $t6, $t7, $v0, $a0

############ Data Segment ############################################################

.data

msg1: .asciiz "Enter marks out of 25: "

msg2: .asciiz "Enter the marks out of 10: "

msg3: .asciiz "Enter the marks out of 15: "

msg4: .asciiz "Enter the marks out of 50: "

msg5: .asciiz "Result: "

################# Code Segment ######################################################

.text

la $a0,msg1 #Load msg1

li $v0,4 #output msg1

syscall

li $v0,5 #input integer

syscall

move $t1,$v0 #copy $v0 to $t1

la $a0,msg2 #Load msg2

li $v0,4 #output msg2

syscall

li $v0,5 #input integer

syscall

move $t2,$v0 #copy $v0 to $t1

la $a0,msg3 #Load msg3

li $v0,4 #output msg3

syscall

li $v0,5 #input integer

syscall

move $t3,$v0 #copy $vo to $t1

la $a0,msg4 #Load msg4

li $v0,4 #output msg4

syscall

li $v0,5 #input integer

syscall

move $t4,$v0 #copy $vo to $t1

add $t7,$t1,$t2 #add

add $t7,$t7,$t3 #add

add $t7,$t7,$t4 #add

la $a0,msg5 #Load msg5

li $v0,4 #output msg5

syscall

li $v0,1 #input integer

move $a0,$t7 #copy $vo to $t1

syscall

li $v0,10

syscall

The result for this program is shown below,

A screenshot of a computer

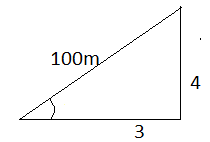
Description automatically generated

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POST LAB

Question:

Write a program that calculates the lengths of base and perpendicular for the following triangle where the ratio of length of perpendicular to base is 4:3



Solution:

I am attaching my commented code below,

#Title : Lab 1 PostLab. Filename: Lab1PostLab.asm

#Author: Muhammad Haris Irfan. Date: 19-09-20

#Roll Number: FA18-BCE-090 Description: Pythagorus Th.

#Registers: $t1, $t2, $t3,$t4,$t5,$t6, $v0, $a0

#################### Data Segment ############################################################

.data

msg1: .asciiz "Enter the value of hypotenuse? " #Msg to promt user to enter Hyp value

msg2: .asciiz "The Value of Perpendicular is : " #Msg to apper in output screen

msg3: .asciiz "\nThe Value of Base is : " # Msg to appear in output screen

#########################Code Segment ######################################################

.text

la $a0,msg1 #Load msg1

li $v0,4 #output msg1

syscall

li $v0,5 #input integer

syscall

move $t1,$v0 #copy $vo to $t1

li $t2,5 #put 5 to $t2

DIV $t3,$t1,$t2 #divide hyp by t2

MUL $t4, $t3,4 #mul t3 by 4

la $a0,msg2 #Load msg2

li $v0,4 #print msg2

syscall

move $a0, $t4 #move t4 to a0

li $v0, 1 #print t4

syscall

la $a0,msg3 #Load msg3

li $v0,4 #print msg3

syscall

MUL $t5, $t4,3 #multiply t4 by 3

DIV $t6, $t5,4 #divide t5 by 4

move $a0, $t6 #move t6 to a0

li $v0,1 #print integer

syscall

li $v0,10 #exit

syscall

The result for this program is shown below,

A screenshot of a computer

Description automatically generated

Critical Analysis:

In This lab, we learnt about the basics of assembly language, such as its writing pattern, the structure and different types of commands used in it, we also implemented some commands such as ADD, MUL, DIV, li and la. Moreover, to complete our tasks, we used registers and tried to understand the functionality of different registers.

\_\_\_\_\_\_THE END\_\_\_\_\_\_\_

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